NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

Pond Sealing or Lining

Bentonite Sealant

(Number)

Code 521C

DEFINITION

Installing a fixed lining of impervious material or treating the soil in a pond mechanically or chemically to impede or prevent excessive water loss.

PURPOSES

To reduce seepage losses in ponds to an acceptable level.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where water loss from a pond through leakage is or will be of such proportion as to prevent the pond from fulfilling its planned purpose or where leakage will damage land and crops or cause waste of water or environmental problems.

CRITERIA

Ponds to be sealed shall be constructed to meet NRCS standards for irrigation pits (552A) or regulating reservoirs (552B), irrigation storage reservoirs (436), ponds (378), waste treatment lagoons (359), waste storage ponds (425), or wildlife watering facilities (648), as appropriate. All work planned shall be in compliance with federal, state, and local laws and regulations.

Soil properties. Sealing with powdered bentonite or similar materials is more applicable on coarse-grained soils where more than half of the soil material is larger than that passing the No. 200 sieve size.

Rate of application. The rate of application shall be based on laboratory tests unless sufficient data are available on the field performance of previously tested soils that are similar in texture and chemical properties to the soils to be sealed.

In the absence of laboratory tests or field performance data on the soils to be sealed, the minimum application per 6-inch compacted lift shall be:

Pervious Soil	Application method	Application rate
		lb/ft^2
Clay	Mixed layer	1.5-2.25
Sandy silt	Mixed layer	1.5-2.25
Silty sand	Mixed layer	2.25-3.0
Clean sand	Mixed layer	3.0-3.75
Open rock or gravel	Clay or sand mixed layer	3.75-4.5

Thickness of treated blanket. The minimum thickness of the finished treated compacted blanket shall be 6 inches for water depths up to 8 feet. For each additional 8 feet of water, another 6-inch layer shall be installed. A minimum thickness of 12 inches is recommended for all areas in the vertical range of water fluctuation.

A protective layer of untreated soil shall be placed over the treated liner in animal waste impoundments. The minimum thickness of the protective layer shall be 6 inches.

All structures shall be fenced for the safety of humans, livestock, wildlife and pets and to protect the liner from damage.

CONSIDERATIONS

Water Quantity

1. Effects upon components of the water budget, especially effects on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation and ground water recharge.

2. Variability of the practice's effects caused by seasonal or climatic changes.

3. Effects on downstream flows or aquifers that would affect other water uses.

4. Potential use for water management to conserve water.

Water Quality

1. Effects on the movement of sediment, pathogens and soluble material substances carried by seepage water.

2. Effects on the visual quality of downstream water resources.

3. Short-term and construction-related effects of this practice on the quality of the pool and downstream water.

4. Effects of soil water level control on the temperatures of downstream waters to prevent undesired effects on aquatic and wildlife communities.

5. Effects on wetlands or water-related wildlife habitats.

PLANS AND SPECIFICATIONS

Plans and specifications for sealing ponds with bentonite shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

The area to be treated shall be cleared of all vegetation and trash and all stones or other objects of a size to interfere seriously with the operation of compaction equipment. The area shall also be drained and dried. Holes shall be filled.

Rock outcrops and other highly permeable areas shall be covered with 2 feet to 3 feet of fine-grained soils.

Sealing chemicals, in a powdered form, should be distributed evenly over the surface to be treated with a drill, seeder, fertilizer spreader or by hand broadcasting. If broadcast by hand, the area should be staked or otherwise marked in grids of 100 square feet.

The sealing material shall be thoroughly mixed as a minimum, into the 6-8 inch layer of soil being treated or to a specific depth. Mixing should be with a rototiller or pulvermixer type equipment. A second mixing should be carried out in a direction perpendicular to the first mixing.

Water should be added by sprinkling during the mixing operation if moisture is not adequate for maximum compaction. If moisture content is too high, the soil should be dried by disking or some other effective process.

Unless laboratory tests indicate differently, each treated layer of soil should be compacted to a dry density of 90 percent or more of maximum standard Proctor with soil at optimum or slightly higher moisture content.

Treated areas shall be protected from puncture by livestock trampling. Areas near the normal water line and at points of concentrated surface flow into the pond shall be protected against erosion. Areas where inflow is concentrated should be protected by riprap. On those soils that are highly susceptible to drying cracks, they

should be protected with straw mulch to prevent cracking and gullying of the blanket before the pond fills.

Applications shall be carried out in such a manner that erosion and air and water pollution are minimized. The completed job shall present a professional finish.

OPERATION AND MAINTENANCE

Maintenance activities required for this practice consist of those operations necessary to prevent breaching of the treated soil layer. This includes excluding livestock and equipment from the treated area; protection of the layer during initial filling, agitation, or pumping operations; and repair of disturbed or eroded areas.